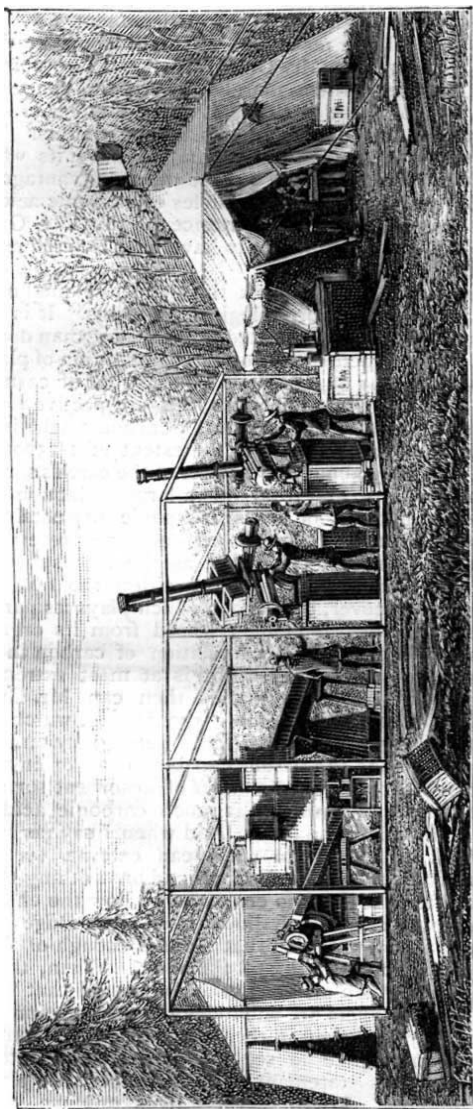


## THE APPROACHING ECLIPSE

THE accompanying illustration from *La Nature* shows the instruments to be used at the total eclipse of May 6, by M. Janssen, who has command of the French expedition. The illustration is after a photograph taken at M. Janssen's Observatory at Meudon. The French expedition, which has probably reached its destination, will be located on Sable Island, near Caroline Island, in the Marquesas Archipelago. Before quitting Paris, M. Janssen had all his instruments and tents erected in order to see that all worked well. The frame surrounding the



Apparatus for French Eclipse Expedition

apparatus is arranged to receive a large awning to protect them. The tent on the right is intended for the astronomers, the furniture consisting of a work-table, several camp-stools, and three beds. The little tent on the left is for photography. The instruments of the French expedition comprise—1. A telescope of short focus for spectroscopic work. 2. An equatorial on which will be arranged a photographic apparatus, containing five cameras which act together. The plates are 0<sup>m</sup>.40 by 0<sup>m</sup>.50; they will require an exposure of five minutes. This apparatus is intended for intra-Mercurial planets. 3. A telescope of 6 inches, with a lens of 3 inches, with photographic appa-

ratus acting by means of three cameras at once. This apparatus is intended for the solar corona. 4. A fourth telescope, specially reserved for M. Trouvelot for drawings of the corona and search for intra-Mercurial planets.

## DEATHS FROM SNAKE BITE IN BOMBAY

THE Report of the Sanitary Commissioner with the Government of Bombay shows that, among other causes of death in that Presidency in the year 1881, 1209 persons died from snake bite. The names of the snakes are not given, but it is probable that the cobra was the chief offender, the echis and bungarus accounting for those not slain by that snake. The monthly prevalence of deaths from this cause is interesting, as it shows at what period of the year efforts for destruction of snakes might be most effectively carried on; it also shows that there was an increase of thirty deaths on those of the preceding year; and it suggests that, however vigorous these efforts may have been, the result is not so satisfactory as could be wished, as a comparison of the deaths in 1881 with the mean of those of five preceding years shows that (in 1881 at least) the number had increased.

Months.	Deaths in 1881.	Mean of five years
January ... ..	39	30
February ... ..	34	24
March ... ..	55	45
April ... ..	55	49
May ... ..	95	93
June ... ..	162	135
July ... ..	191	164
August ... ..	165	159
September ... ..	161	160
October ... ..	128	144
November ... ..	80	68
December ... ..	44	39
	1209	1110

This (in 1881) proves that one person in 13,610 of the whole population of 16,450,414 for the twenty-four Presidency districts died from snake bite. June, July, August, September, and October are the months of greatest mortality, and it would be worth while inquiring if more vigorous efforts could not be made for the destruction of the snakes during these months, when it is presumed the creatures are more numerous and perhaps more active in their destructive work. The appearance and character of venomous as distinguished from harmless snakes ought now to be so well known in India that, whatever other difficulty may stand in the way of their destruction, absence of means of identification should not be one of the obstacles.

After all the mortality from snake bite is very small compared with that from other causes. The same able and most valuable Report shows that in the year 1881 there were 272,403 deaths from fever, of which no doubt a large proportion were due to miasmatic causes. The entire death-rate from all causes amounts to 381,450, or 23.18 per 1000 of the whole population. Against these death-rates and their preventable causes, whether from dirt, miasmata, foul water, or snake virus, the earnest endeavours of the sanitary authorities are now unremittingly directed, and it is impossible to read the Reports annually prepared by the Sanitary Commissioners without feeling impressed by their value and importance, or without a conviction that they must sooner or later have beneficial results on public health and the value of life in India.

JOSEPH FAYRER

## ASTRONOMICAL PHOTOGRAPHY

THE important part that photography is likely to play in the future of astronomy renders it desirable that an opportunity should be afforded to astronomers to

acquaint themselves with the improvements continually made in this branch of their science. This could best be done by the establishment at convenient places of collections designed to exhibit the progress of photography as applied to astronomical observations.

The Harvard College Observatory has some special advantages for forming such a collection, since it already possesses many of the early and historically important specimens which would naturally form part of the series. Among these may be mentioned four series of daguerreotypes and photographs of various celestial objects taken at this Observatory. These series were respectively undertaken in 1850, 1857, 1869, and 1882.

At present, the astronomers of the United States have no ready means of comparing their own photographic work with that done in Europe, or even with that of their own countrymen. The proposed collection of photographs, so far as it could be rendered complete, would greatly reduce the difficulty.

It is therefore desired to form, at the Harvard College Observatory, a collection of all photographs of the heavenly bodies and of their spectra which can be obtained for the purpose; and it is hoped that both European and American astronomers will contribute specimens to this collection. Original negatives would be particularly valuable. It may happen that some such negatives, having slight imperfections which would limit their value for purposes of engraving, could be spared for a collection, and would be as important (considered as astronomical observations) as others photographically more perfect. In some cases, astronomers may be willing to deposit negatives taken for a special purpose, and no longer required for study, in a collection where they would retain a permanent value as parts of an historical series. Where photography is regularly employed in a continuous series of observations, it is obvious that specimen negatives only can be spared for a collection. But in such cases it is hoped that some duplicates may be available, and that occasional negatives may hereafter be taken for the purpose of being added to the collection, to exhibit recent improvements or striking phenomena.

When negatives cannot be furnished, glass positives, taken if possible by direct printing, would be very useful. If these also are not procurable, photographic prints or engravings would be desirable.

In connection with the photographs themselves, copies of memoirs or communications relating to the specimens sent, or to the general subject of astronomical photography, would form an interesting supplement to the collection. A part of the contemplated scheme will involve the preparation of a complete bibliography of the subject, including a list of unpublished photographs not hitherto mentioned in works to which reference may be made.

The expense which may be incurred by contributors to the collection in the preparation and transmission of specimens will be gladly repaid by the Harvard College Observatory when desired.

EDWARD C. PICKERING,  
Director of the Harvard College  
Observatory

Cambridge, Mass., February 21

#### DARWIN AND COPERNICUS<sup>1</sup>

THE losses by death which natural science has sustained during the past year are unusually heavy. The fertile and ingenious mathematician who for more than a generation held a leading position among French men of science as the publisher of one of the best-known mathematical journals; the chemist who, by the first organic synthesis, helped to dispel the illusion of vital

<sup>1</sup> Address by Prof. E. Du Bois Reymond at the anniversary meeting of the Berlin Academy of Sciences.

energy; the physiologist who solved one of the oldest problems of humanity—are men whose death leaves a void not easily filled up. But the lustre of even such names as Liouville, Wöhler, and Bischoff pales before that of the first on our list, Charles Darwin. Nearly every learned Society in existence has publicly deplored his loss. As this Academy has not hitherto found a fitting opportunity for doing so, it is necessary to add a few words to the formal mention of his decease, to show that we also appreciate the greatness of the man and of the loss science has sustained in him.

To say anything fresh concerning him will only be possible when the lapse of time and the progress of science have opened up new points of view; and the speaker, who has often had occasion to discuss Darwin before this Academy, finds it especially difficult not to repeat himself, the more so as opinions of his work are still somewhat apt to be influenced by personal feeling.

Darwin seems to me to be the Copernicus of the organic world. In the sixteenth century Copernicus put an end to the anthropocentric theory by doing away with the Ptolemaic spheres and bringing our earth down to the rank of an insignificant planet. At the same time he proved the non-existence of the so-called empyrean, the supposed abode of the heavenly hosts, beyond the seventh sphere, although Giordano Bruno was the first who actually drew the inference.

Man, however, still stood apart from the rest of animated beings—not at the top of the scale, his proper place, but quite away, as a being absolutely incommensurable with them. One hundred years later Descartes still held that man alone had a soul and that beasts were mere automata. Notwithstanding all the labour of naturalists since the days of Linnæus, notwithstanding the resurrection of vanished genera and species by Cuvier, the theory of the origin and interdependence of living things, which was almost universal five-and-twenty years ago, was only equalled in arbitrariness, artificiality, and absurdity by the celebrated theory of Epicycles, which caused Alfonso of Castile to exclaim, "If God had asked my advice when he created the world, I should have managed things much better."

"Afflavit Darwinius et dissipata est," would, alluding to the above-mentioned theory, be a fitting inscription for a medal in honour of the "Origin of Species." For now all things were seen to be due to the quiet development of a few simple germs; graduated days of creation gave place to one day on which matter in motion was created; and organic suitability was replaced by a mechanical process, for as such we may look on natural selection, and now for the first time man took his proper place at the head of his brethren.

We may compare Copernicus's student days at Bologna with Darwin's voyage in the *Beagle*, and his retired life at Frauenburg with Darwin's in his Kentish home, up to the time when the appearance of Mr. Wallace's work caused him to break his long silence. Here happily for Darwin the parallel ends. Many circumstances combined in Darwin's case to render his task easier and insure his ultimate triumph. Botany and zoology, morphology, the theory of evolution, and the study of the geographical distribution of plants and animals, had advanced far enough to allow of general conclusions being drawn from them; Lyell's sound sense had freed geology from the hypotheses which disfigured it, and introduced the idea of uniformity into science. The doctrine of the conservation of energy had been put on a new basis, and extended so that in combination with astronomical observation it gave rise to entirely new views of the history and duration of the universe. The doctrine of vital energy had been proved to be untenable on closer investigation. An unusually dry season had some years earlier led to the discovery of the so-called lake-dwellings in the bed of one of the